SERVICE MANUAL

Aktilite® CL16

Ver 1.1

Photocure ASA
Hoffsveien 48
NO-0377 OSLO, Norway

Phone: +47 22 06 22 10
www.photocure.com

SERVICE MANUAL
Aktilite® CL16

Any kind of service should only be carried out by authorised personnel.
Refer to the User Manual for further information regarding safety and precautions.

TABLE OF CONTENTS

1 Assembly of Aktilite® CL16 Lamp with Parallel Arm 3
1.1 Material/Equipment 3
1.2 Housing bottom module (16-0-200) assembly 4
1.3 Housing fanside module (16-0-300) assembly 5
1.4 Light module (16-0-400) assembly 6
1.5 Housing top module (16-0-500) assembly 7
1.6 Lamp head module (16-0-800) assembly 8
1.7 Lamp head and parallel arm module (16-0-900) assembly 11
1.8 Labels placement description 12
2 Replacing the DC Power Plug 13
3 Assembly of Aktilite® CL16 CONDOR Power Supply 14
3.1 Material/Equipment 14
3.2 Cable pack input (16-0-670) assembly 14
3.3 Cable pack output (16-0-680) assembly 15
3.4 Power supply (16-0-650) assembly 15
4 Error Codes 17

1 Assembly of Aktilite® CL16 Lamp with Parallel Arm

1.1 Material/Equipment

Tools needed for the assembly of the Aktilite® CL16 lamp

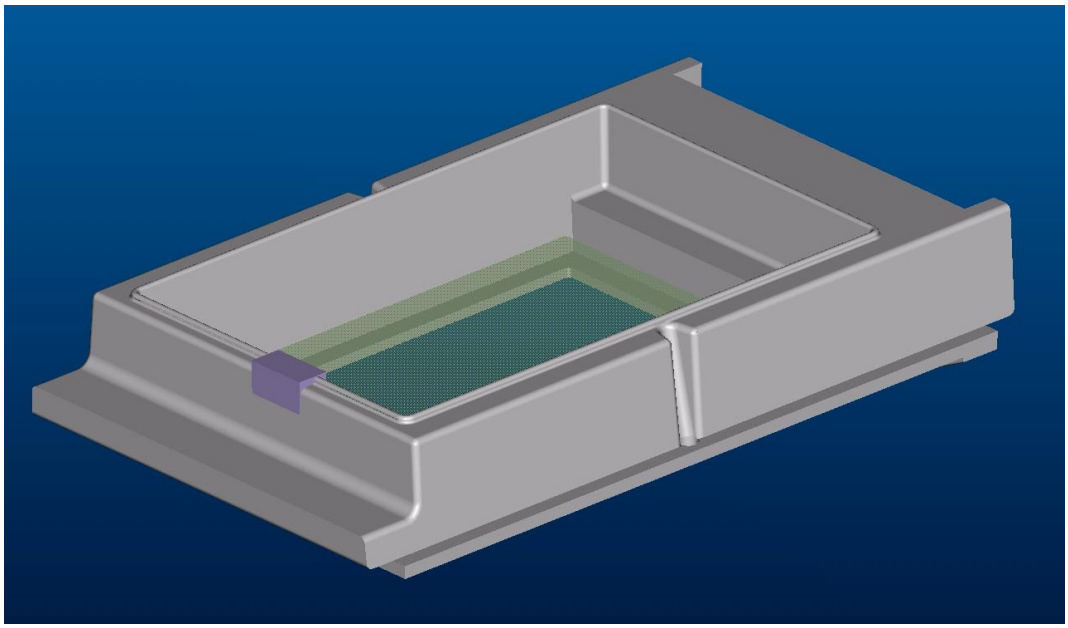
Required tools

# of items	Description
1	Screwdriver, Torx 10 – Tool A
1	Screwdriver, Torx 20 – Tool B
1	Tool C: special tool for pressing the axle, arm into the heat sink
1	Tool D: small, flat screwdriver
1	Plug assembler tool (ELFA 80-490-58) – Tool E
-	Silicone
-	Glue B
-	Rubbing alcohol (fat free)

1.2 Housing bottom module (16-0-200) assembly

Required items

Part #	# of items	Description
16-1-201	1	Housing bottom
16-1-202	1	Gasket, cable, bottom
16-1-203	1	Protective window
16-1-206		Silicone
		Rubbing alcohol (fat free)



Assembly description

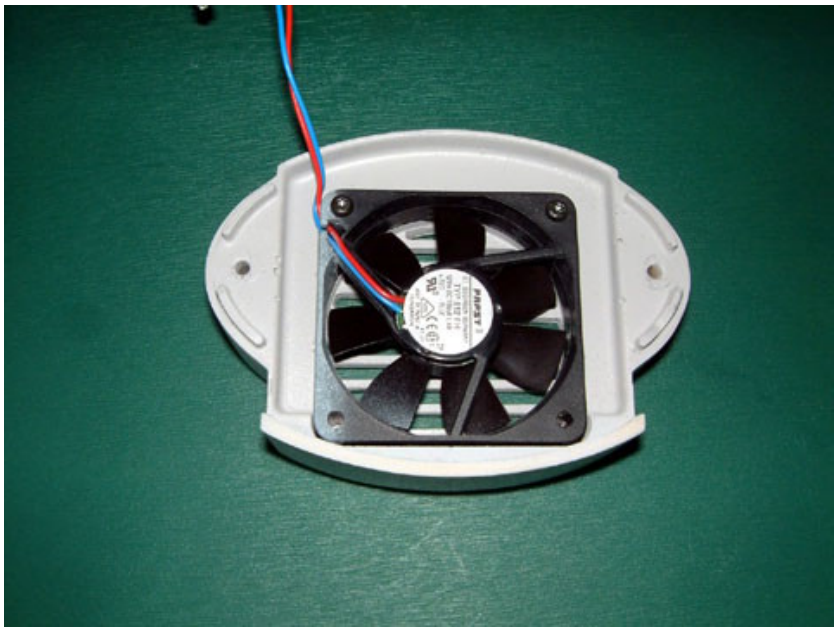
Step 1) Clean the recessed area at protective window (16-1-203) using a cloth and rubbing alcohol.
Step 2) Attach the protective window (16-1-203) to the housing bottom (16-1-201) using silicone.
Step 3) Remove the protective paper from the Gasket, cable, bottom (16-1-202), and press it firmly against the housing bottom (16-1-201).

As a spare part this comes fully assembled.

1.3 Housing fanside module (16-0-300) assembly

Required items

Part #	# of items	Description
16-1-301	1	Housing, fan side
16-1-302	1	Fan Papst 612 FH, with cable and connector
16-1-303	2	Screws, Fan - Housing, fan side
		Tool A: Screwdriver, Torx 10
		Glue B



Assembly description

Step 1) Place the fan (16-1-302) in the housing fan side (16-1-301) with the cable oriented correctly

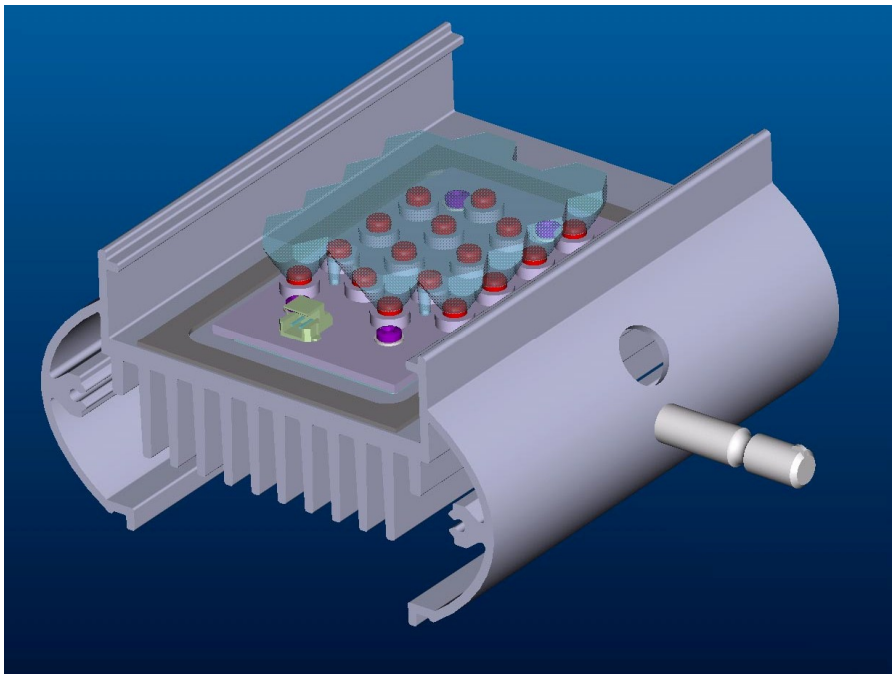
Step 2) Screw the two screws (16-1-303) in the upper holes to keep the fan and the housing fan side together.

Step 3) Put a drop of glue in the channel where the cords go into the centre section of the fan.

1.4 Light module (16-0-400) assembly

Required items

Part #	# of items	Description
16-1-401	1	Lens
16-1-402	1	LED-panel
16-1-420	1	Heat sink, machined with logo
16-1-404	1	Heat conductive pad, LED
16-1-405	1	Gasket, frame, bottom
16-1-406	1	Axle, arm
16-1-407	4	Washers, for screws in LED-panel
16-1-408	4	Screws, LED-panel - heat sink
		Tool B: Screwdriver, Torx 15
		Tool C (special tool for pressing the axle, arm into the heat sink)
16-1-410		Glue B



Assembly description

Step 1) Press the axle, arm (16-1-406) into the hole on the heat sink (16-1-420), assuring that the tap on the axle is facing straight downwards. Special pressing tool or jig should be used for this.

Step 2) Turn the heat sink upside-down and place the "heat conductive pad, LED" (16-1-404) on it so that its holes lines up with the holes in the heat sink.

Step 3) Perform a visual inspection of the soldering joints on the LED array PCBs.

Step 4) Place the LED panel (16-1-402) on the "heat conductive pad, LED" (16-1-404), assuring that the contact on the LED panel is facing in the correct direction.

Step 5) Screw the screws (16-1-408) with washers (16-1-407) through the holes on the LED-panel to the heat sink.

Step 6) Remove the protective paper from the self-adhesive Gasket, frame, bottom (16-1-405), and place it on the heat sink, as close as possible to the LED-panel on its contact side.

Step 7) Apply a small drop of Glue B (16-1-410) in the four holes on the LED panel and place the lens in position, assuring that its four "towers" enters the holes.

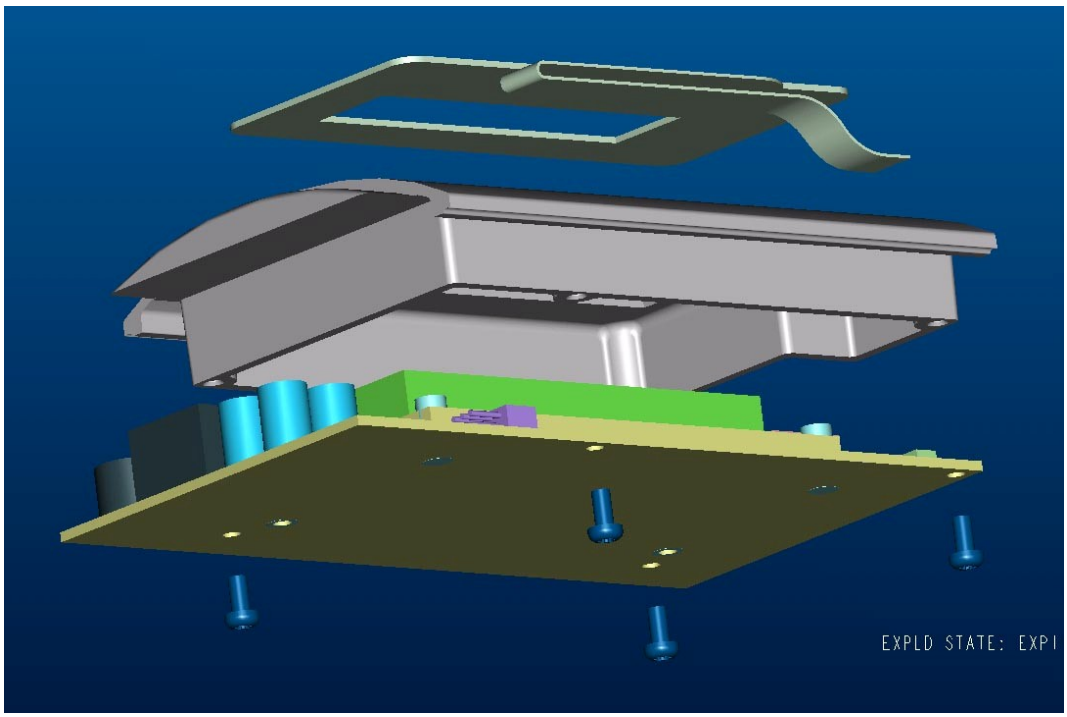
Step 8) Put a light pressure onto the lens module until the glue has cured.

Step 9) This module is now going to be optically tested before further assembly.

1.5 Housing top module (16-0-500) assembly

Required items

Part #	# of items	Description
16-1-501	1	User interface
16-1-502	1	Housing top
16-1-503	4	Screws Electronics- Housing, top
16-1-602	1	System electronics
		Tool A: Screwdriver, Torx 10
		Rubbing alcohol



Assembly description

Step 1) Clean the recessed area at the top of the housing top (16-1-502) using a cloth and rubbing alcohol

Step 2) Remove the protective paper from the self-adhesive key touch panel (16-1-501) and glue it to the housing top (16-1-502), leading the flex-tail through the corresponding hole.

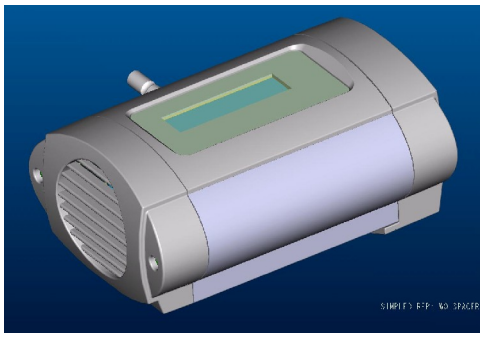
Step 3) Put the flex-tail in the connector on the system electronics (16-0-600) and close the connector by pressing the black part down and in.

Step 4) Assure that the flex-tail falls smoothly into place and assemble the system electronics (16-0-600) to the housing top (16-1-502) using the 4 screws (16-1-503).

1.6 Lamp head module (16-0-800) assembly

Required items

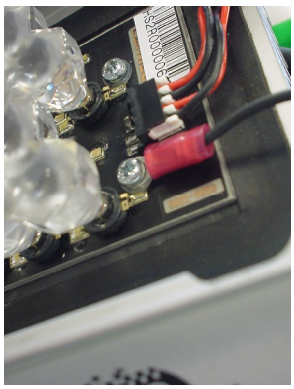
Part #	# of items	Description
16-1-801	1	Housing outlet side
16-0-200	1	Housing bottom module
16-0-300	1	Housing fanside module
16-0-400	1	Light module
16-0-500	1	Housing top module
16-0-700	1	Arm & accessories module
16-1-802	4	Screw, Housing, sides - heat sink
16-1-809	1	Cable A from power supply to lamp head
16-1-810	1	Cable B from LED-panel to electronics
16-1-811	1	Cable tension release
		Tool A: Screwdriver, Torx 10
		Tool D: small flat screwdriver

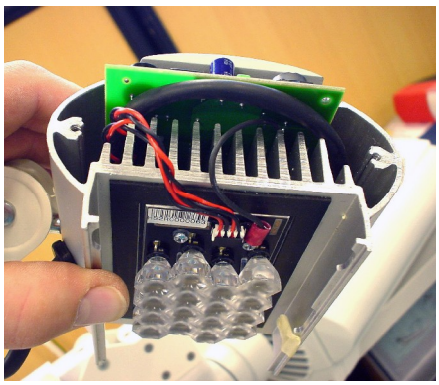


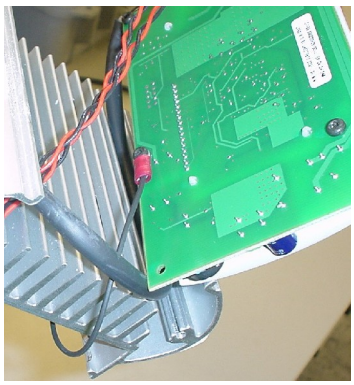
Assembly description

Step 1) Connect the cable B (16-1-810) to the connector B in the housing top module (16-0-500) and to the connector on the LED-panel in the housing bottom module (16-0-200)

Step 2) Connect the Earth cable between the 'M2' plated hole of the PCB and the chassis of the lamp (cooling fin/metal body of the lamp). Refer to cable spec. from Kitron Development "LED cables CL16" Rev.A



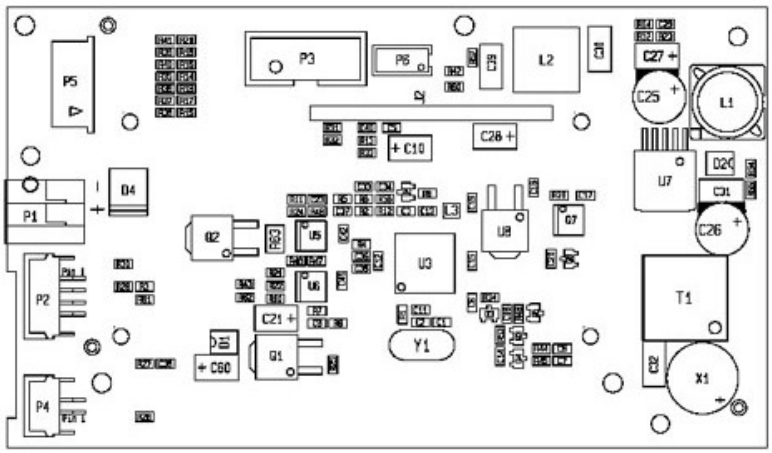




Step 3) With the front of the Light module (16-0-400) against you, slide the Housing top module (16-0-500) into it from left to right

Step 4) Put the Cable A 16-1-809 through the hole in the housing top module and put it in the connector A in the housing top module (16-0-500), using a small screwdriver to press the connector open.

Step 5) Seen from the terminal input side, cord marked 1 [+] goes to the right side of the terminal, and cord marked 2 [-] goes to the left side of the terminal.



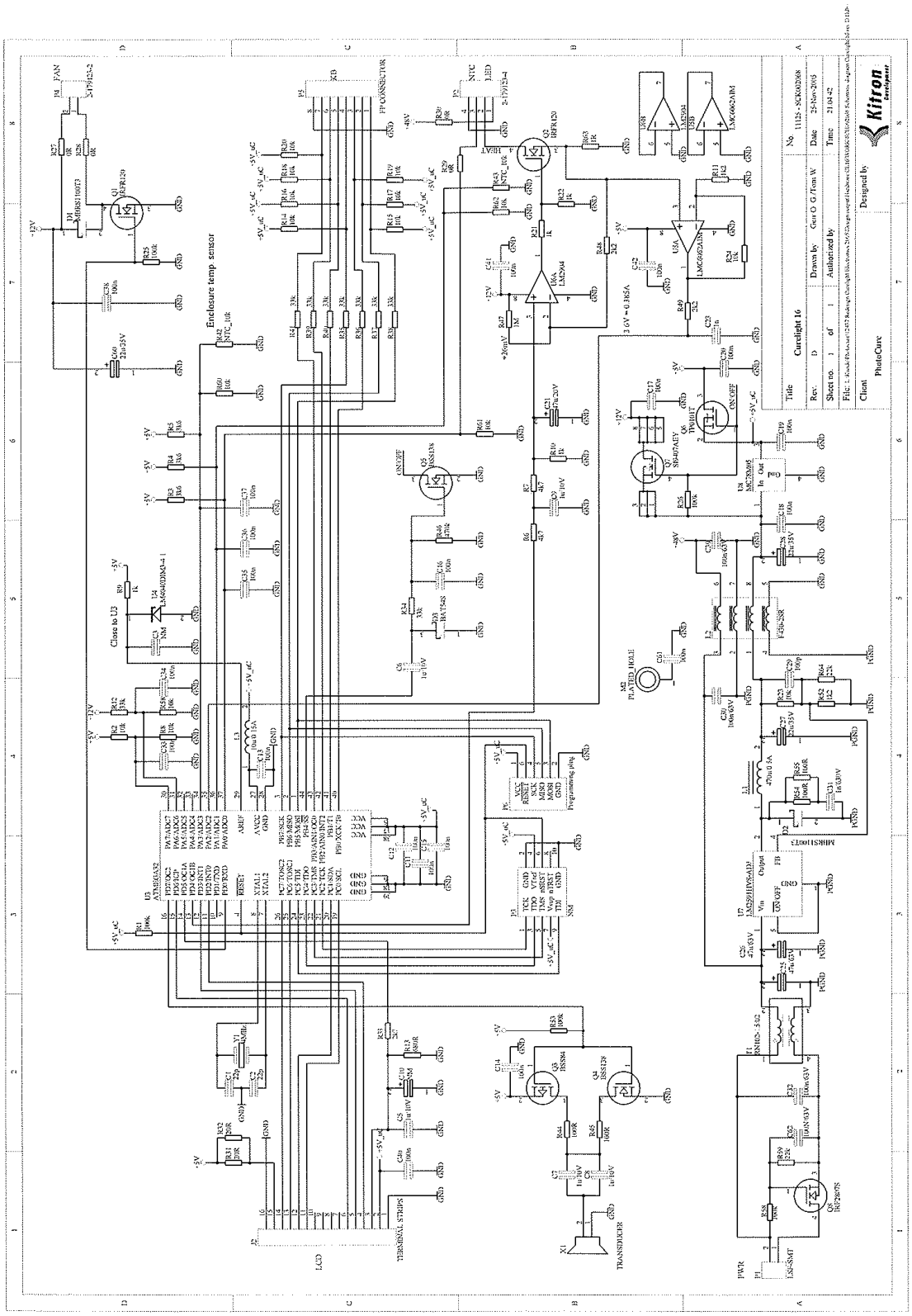
Step 6) Still with the front of the Light module (16-0-400) against you, assemble the Housing outlet side to its left side, using two screws (16-1-802)

Step 7) Put the Housing bottom module (16-0-200) in its place, assuring that the Cable A (16-1-810) is hit by the gasket on the Housing bottom module

Step 8) Connect the cable from the fan in the Housing fan side module (16-0-300) to the connector C in the housing top module (16-0-500)

Step 9) Assemble the Housing fan side, using the two screws (16-1-802).

Step 10) Press in the cable tension release (16-1-811) where the cable enters the heat sink. Use a pair of pliers for this.



1.7 Lamp head and parallel arm module (16-0-900) assembly

Required items

Part #	# of items	Description
16-0-800	1	Lamp head module
16-1-901	1	Parallel arm (with friction unit towards axle arm)
16-1-902	1	Plug – On cable from lamp head to PS
16-1-813		Label Power Plug
		Tool E: Plug assembler tool (ELFA 80-490-58)

Assembly description

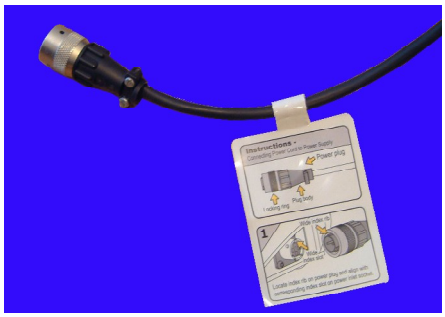
Step 1) Unscrew the friction unit of the Parallel arm, insert the axle arm from the Lamp head module, and tighten until the friction is sufficient.

Step 2) Tread the cable from the Lamp head module (16-0-800) through the Parallel arm (16-1-901).

Step 3) Put on the strain relief.

Step 4) Assemble the plug onto the cable (16-1-902), attaching cord marked 1 to "D" [+] in the plug and cord marked 2 to "B" [-] in the bayonet plug. Use the crimping tool for the crimp pins or solder the pins. Use one drop of Loctite and screw on the strain relief to bayonet plug. Use the two self-threading screws to secure the pressure pad on the strain relief, with the lowered side facing the cable. ***NOTE:*** If you by accident put the pin in the bayonet plug in the wrong position, there is a special tool available to remove the pins again.

Step 5) Remove the protective paper from the backside of the label Power Plug. (16-1-813) and attach the label to the cord, next to the bayonet plug, as shown in the picture below.

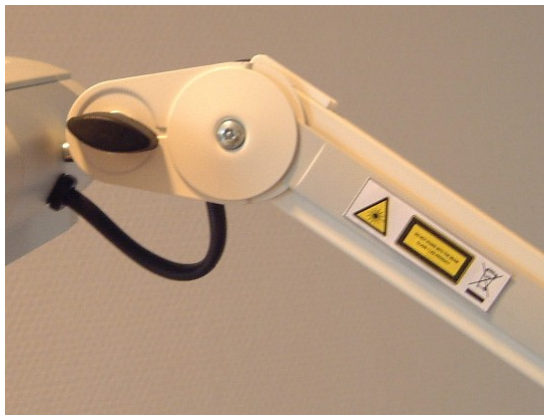


NB! Use new stronger plug Souriau UTS 6JC104P for repaired lamps.

1.8 Labels placement description

Required items

Part #	# of items	Description
16-0-900	1	Lamp including parallel arm
16-1-904	1	Label Serial Number
16-1-903	1	Label Warning and Special Waste



Assembly description

Place the labels according to the pictures above. Note that the two labels should be placed on opposite sides of the lamp arm:

- Label Serial no. on the right side, near the bottom end of the arm
- Label Warning and Special Waste on the left side, near the lamp head

2 Replacing the DC Power Plug

Assembly description

Step 1) Put the stain relief onto the DC power cable. Put on the male crimp pins using the specially made crimping tool. Put the cord numbered 1 into "D" [+] in the bayonet plug, and the pin with cord marked 2 in "B" [–] in the bayonet plug. If you make a mistake, you can use the specially made extractor tool to release the pins from the bayonet plug again.

Step 2) Put a drop of Loctite on the threads at the strain relief threads and screw the strain relief to the bayonet plug.

Step 3) Double check:

Cord marked 1 into "D" [+ or red]
Cord marked 2 into "B" [– or black]

New plug

Extractor tool

To use the extractor tool, press the tool firmly into the connector by holding the centrepiece of the tool, and continue to press onto the top piece.

If wires have to be reconnected to the pins, it is recommended to solder them on, as otherwise this requires special crimping tools.

- Part number for the plug is: 128-1-261 Souriau UTS 6JC104P with pins (extra) 128-1-263 (RM16M23K)
- Part number for the wall mounted connector is 128-1-323 261 Souriau UTO 0104SH with mating pins 128-1-345 (RC16M23K)

3 Assembly of Aktilite® CL16 CONDOR Power Supply

Note: *This is only used for the Nordic Markets. The other markets uses a Mascot power supply.*

Aktilite CL16 is delivered with two different power supplies, depending on the market: CONDOR power supply and MASCOT power supply. The CONDOR power supply is only delivered on the Scandinavian markets.

NOTE: This assembly procedure is only valid for CONDOR power supply. The MASCOT power supply is not to be opened and must be replaced if not working.

3.1 Material/Equipment

Tools needed for the assembly of the Aktilite® CL16 CONDOR Power Supply

Required tools

# of items	Description
1	Screwdriver, Pozidrive 2 – Tool A
1	Screwdriver, Torx 10 – Tool B
1	Screwdriver, Torx 20 – Tool C
1	Cable shoe mounting tong – Tool E
1	AMP-Connector mounting tong – Tool F
1	Crimp socket mounting tong – Tool G
1	Voltage adjusting jig
-	Lacquer (for sealing pot meter)

3.2 Cable pack input (16-0-670) assembly

Required items

Part #	# of items	Description
16-1-671	1	Cable A, blue neutral AC conductor
16-1-672	1	Cable B, brown live AC conductor
16-1-673	1	Cable C, green/yellow ground cable
16-1-674	3	Cable shoes, flat type
16-1-675	1	Connector AMP
		Tool E: Cable shoe mounting tong
		Tool F: AMP-Connector mounting tong

Assembly description

Step 1) Assemble one cable shoe (16-1-674) to each of the three cables, using tool E.

Step 2) Assemble the three cables to the connector using tool F. Assure that they are placed like this: pin 1 = Cable A (AC neutral), pin 2 = Cable C (NO Pin), Pin 3= Cable B (AC Live)

3.3 Cable pack output (16-0-680) assembly

Required items

Part #	# of items	Description
16-1-681	1	Cable D, red load cable
16-1-682	1	Cable E, black load cable
16-1-683	2	Crimp sockets
16-1-684	1	Connector AMP
		Tool F: AMP-Connector mounting tong
		Tool G: Crimp socket mounting tong

Assembly description

Step 1) Assemble one crimp socket (16-1-683) to each of the two cables, using tool G.
Step 2) Assemble the two cables to the connector using tool F. Assure that they are placed like this:

Pin 5= Cable E (-) Black
Pin 2= Cable D (+) Red

Pin 1 is marked on the Printed Circuit Board

3.4 Power supply (16-0-650) assembly

Required items

Part #	# of items	Description
16-1-651	1	Casing, machined
16-1-652	1	Power - Condor GLM65-48
16-1-653	4	Washer
16-1-654	1	Wall mounted connector Souriau UTO 0104SH
16-1-655	4	Screws PS-casing
16-1-656	1	In plug (IEC 320)
16-1-657	2	Screws In-plug
16-1-658	4	Dist washers
16-1-659	1	Ferrite (Load side)
16-1-660	1	Ferrite (Mains side)
16-1-661	4	Feet pads (self adhesive)
16-1-662	4	Screws Out-plug
16-1-664	1	Label with Approvals
16-0-670	1	Cable pack input
16-0-680	1	Cable pack output
		Tool A: Screwdriver, Pozidrive 2
		Tool B: Screwdriver Torx 10
		Tool C: Screwdriver Torx 20
		Voltage adjusting jig
		Laquer (for sealing pot meter)

Assembly description

Step 1) Connect the ***Cable pack input (16-0-670)*** to the ***power (16-1-652)*** in its responding AMP connector.

Step 2) Assemble the ***Cable pack output (16-0-680)*** the ***power (16-1-652)*** in its responding AMP connector.

Step 3) Thread both cables in the ***Cable pack input (16-0-670)*** through the ***ferrite (mains cables) (16-1-660)*** 4 times.

Step 4) Thread all three cables in the ***Cable pack output (16-0-680)*** through the other ***ferrite (load cable) (16-1-659)*** 3 times.

Step 5) Assemble the ***Power (16-1-652)*** into the ***casing (16-1-651)*** with the ***distance washers (16-1-658)*** between. Use the 4 ***Screws PS-Casing (16-1-655)*** with ***washers (16-1-653)***. Make sure that the red and black load cables are on the same side as the power outlet plug. Use the Tool C.

Step 6) Assemble the ***DC power outlet plug (16-1-654)*** onto the ***casing (16-1-651)***, with the four ***Screws Out plug (16-1-662)***. Make sure it is fastened in the correct position, with one of the 3 locking pins facing upwards. Use Tool B.

Step 7) Connect the crimp sockets of the ***Cable pack output (16-0-680)*** to the DC out plug. Plug the red and black load cables into the correct holes in the power outlet plug. The red cable (+) goes into the slot marked D, and the black cable (-) goes into the slot marked B.

Step 8) Assemble the ***AC in plug (16-1-656)*** onto the ***casing (16-1-651)*** with the 2 ***Screws in plug (16-1-657)***. Make sure it is fastened in the correct position, with the central pin facing upwards. Use Tool B.

Step 9) Connect the three cables in the ***Cable pack input (16-0-670)*** to the ***AC in plug (16-1-656)***. Cable A (blue) is connected to pin marked N, Cable B (brown) is connected to the tongue marked L, and Cable C (green/yellow) is connected to pin marked with the ground symbol.

Step 10) Fix the ferrites to the casing with a strip, silicon or other means.

Step 11) Close the ***casing (16-1-651)*** and screw it together.

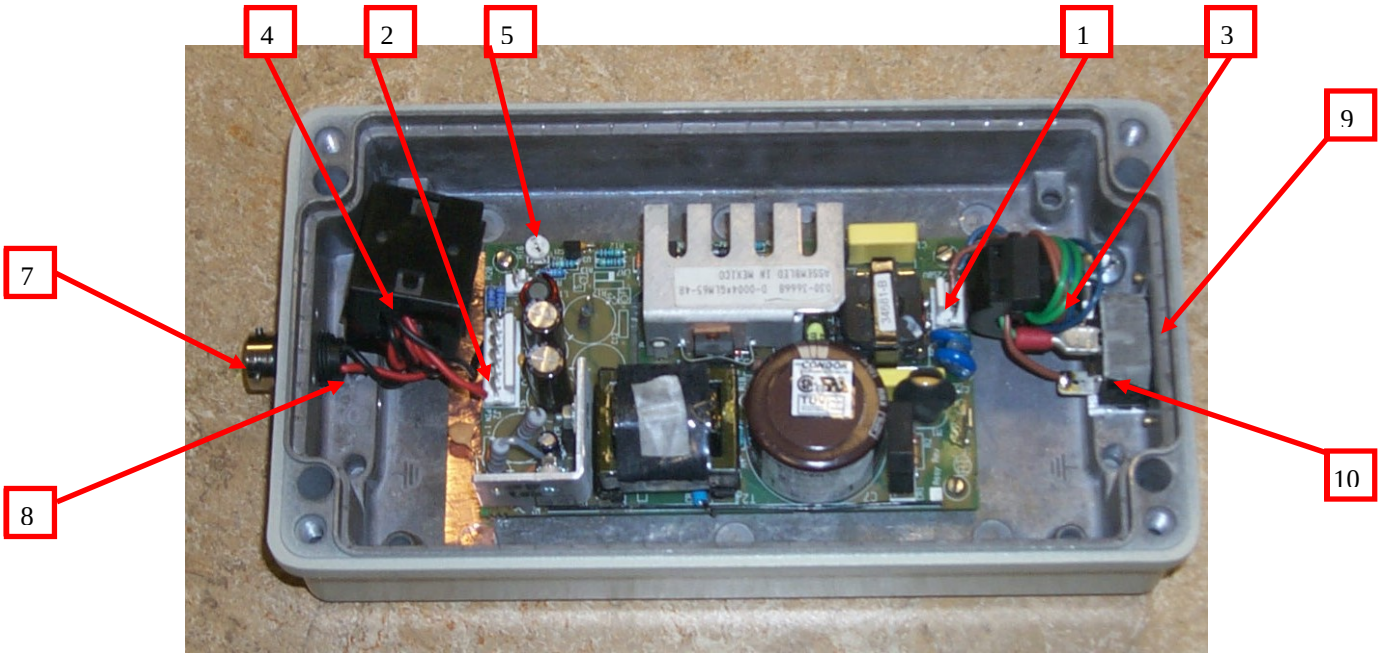
Step 12) Connect the 5 cables to the ***voltage adjusting jig*** terminals, and set the output voltage to 50.4 Volt by adjusting the blue pot meter near the DC power output terminals. Secure the pot meter by a drop of lacquer. (ref. TCU-002-16C)

Step 13) Apply ***Label Nemko (16-1-663)*** to the underside of the casing.

Step 14) Remove the protective paper and assemble the four self-adhesive ***feet pads (16-1-661)*** to the underside of the casing, one in each corner.

Step 15) Note the serial number on the underside of the box. Take out the QA documentation that follows the "Traveller" for the DHR.

Step 16) The unit is now ready for further testing.



4 Error Codes

The Aktilite CL16 has in-built monitoring features. If an error should occur, the display will show the following message and five rapid beeps will be heard:

If an error code is displayed, or if any other unexpected condition occurs (e.g. lamp does not operate), the following steps should be taken:

1. **Disconnect the mains cable for at least 20 seconds**
2. **Reconnect the mains cable**
3. **Check all cables and connections**
4. **Switch on and check if the lamp can be used as normal**
5. **If the error persists, refer to the table below**

Aktilite CL16 Error Codes		
NOTE: Refer to the instructions above before using the table		
Error Code	**Possible Causes**	**Description**
1101	Device internal error	POST FLASH (Program memory) error.
1102	Device internal error	POST EEPROM (System parameters) error.
1103	Device internal error	POST RAM (Static memory) error.
1104	Key was pressed during switch-on self-test or Device internal error	POST key stuck error.
1105	Device internal error	POST too low enclosure temperature error.
1107	Device internal error	POST too low LED driver temperature error.
1109	Device internal error	POST too big variation LED driver temperatures error.
1110	Device internal error	POST too low LED array temperature error.
1112	Device internal error	POST too big variation LED array temperatures error.
1117	The lamp has reached the maximum allowed number of illumination hours.	Need to recalibrate or replace the light source.
1206	Obstruction of cooling air inlet/outlet or Device internal error	POST too high enclosure temperature error.
1208	Obstruction of cooling air inlet/outlet or Device internal error	POST too high LED driver temperature error.
1211	Obstruction of cooling air inlet/outlet or Device internal error	POST to high LED array temperature error.
2105	Device internal error	Self-test too low enclosure temperature error.
2107	Device internal error	Self-test too low LED driver temperature error.
2109	Device internal error	Self-test too big variation LED driver temperatures error.
2110	Device internal error	Self-test too low LED array temperature error.
2112	Device internal error	Self-test too big variation LED driver temperatures error.

Aktilite CL16 Error Codes		
NOTE: Refer to the instructions above before using the table		
Error Code	**Possible Causes**	**Description**
2206	Obstruction of cooling air inlet/outlet or Device internal error	Self-test too high enclosure temperature error.
2208	Obstruction of cooling air inlet/outlet or Device internal error	Self-test too high LED driver temperature error.
2211	Obstruction of cooling air inlet/outlet or Device internal error	Self-test too high LED array temperature error.
2213	Device internal error	Self-test watchdog error. The software has been restarted.
2214	Device internal error	Self-test too high LED current for OFF mode.
2215	Device internal error	Self-test too high LED current for GUIDE LIGHT mode.
2216	Device internal error	Self-test too high or too low LED current for FULL LIGHT mode.